DE-PS26-01-NT40869

Chevron Petroleum Technology Company
2800 Hayes Road, Houston, TX 77242
Dr. Emrys Jones
Phone: 281-596-2269
FAX: 281-596-2620
E-Mail Address: EMRY@chevron.com

Characterizing Natural Gas Hydrates in the Deep Water Gulf of Mexico: Applications for Safe Exploration and Production Activities

Abstract

According to published information, 1,974 wells have been drilled in the deep water Gulf of Mexico (GOM), which is that portion of the Gulf with water depths of 1000 feet or more. There are currently 40 rigs in the GOM that are capable of drilling in water depths of 1000 ft or more. Currently, 30 of those rigs are actually drilling in deep water. The other 10 are either drilling in water depths less than 1000 ft. or in the yard for repairs. Many experts believe that there are massive volumes of naturally occurring gas hydrates in the deep water GOM. Even though no major safety problems have occurred, and for a variety of reasons, the oil and gas industry needs to develop technology to locate and characterize these naturally occurring gas hydrates.

The main reason for conducting the research described in this proposal is to collect data, generate protocols, develop knowledge and promote safety in the future development of oil and gas fields in the deep water GOM. To accomplish this main objective, we have developed a comprehensive research plan that is divided into two phases, with an optional third phase, if warranted.
Phase I will begin in 2001 and will last through 2002. During Phase I, we will hold workshops, collect data, analyze the data, develop protocols, and plan a core and well log data collection effort that will be conducted during Phase II of this project. We plan to hold workshops to collect data and case histories, determine what data are required by geoscientists and engineers for their models, and determine how to drill through naturally occurring gas hydrates, how to core these hydrates, and how to handle, transport and test these core samples. We will also conduct projects to encourage the development of gas hydrate sensors, well bore stability models, and better seismic acquisition and analyses of the formations near the seabed floor in deep water. We will also begin laboratory analyses of the kinetic, thermodynamic, physical and chemical properties of core samples that are saturated or partially saturated with gas hydrates. All of these measurements will improve our ability to measure the properties of gas hydrates using signals from seismic, drilling, MWD, logging and coring operations in future field tests. One important deliverable from Phase I will be a recommendation concerning the location for drilling two test wells in Phase II.

Phase II will primarily consist of drilling wells in two areas in the deep water GOM for the primary purpose of collecting drilling, MWD, logging and coring data. Phase II will occur during 2003 and 2004. We will evaluate all data in detail and integrate the data

with existing data and seismic information. Two wells will be drilled in an area that should contain a large volume of naturally occurring gas hydrates. The third well will be drilled near by, but in an area that does not contain any gas hydrates. Ideally, the data sets from the two areas will allow us to determine the effects of gas hydrates in the pore space of the rocks upon the responses from seismic data, drilling data, MWD data, open hole logging data, core data and any test data we can acquire.

The results from Phases I and II will be evaluated. If warranted by the results, a Phase III project will be proposed. The Phase III project will begin in 2005 and will conclude in 2007. Phase III will involve drilling 7 additional data collection wells in the deep water GOM.